CompressorBank

The Complete Compressor

User Manual

McDOWELL SIGNAL PROCESSING, LLC

McDSP CompressorBank Plug-In Manual

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Getting Started with CompressorBank

Each McDSP plug-in is delivered inside an installer application, and uses the Interlok copy protection software to authorize each plug-in. This section describes how to install and authorize a McDSP plug-in. General system requirements are also described.

System Requirements

McDSP HD, Native, and LE plug-ins are compatible with Pro Tools™ HD, HD Accel TDM systems, as well as Pro Tools™ LE and Pro Tools™ M-Powered host based systems. McDSP plug-ins support Mac OS 10.4.x (Tiger), 10.5.x (Leopard), Windows XP and Vista and require Pro Tools 7.x, 8.x or greater. McDSP plug-ins require an iLok USB Smart Key.

Configurations

McDSP plug-ins are available in TDM, RTAS, and AudioSuite configurations. See individual products for specific available configuration sets.

Applications

Pro Tools™ 7.x, 8.x or higher is required for TDM, LE, and M-Powered systems. Additionally, a third party software application that supports the Digidesign TDM, RTAS, or AudioSuite plug-in standard may be supported. See http://www.digidesign.com/developers/plugin_info/ for more information.

McDSP plug-ins are compatible with the entire Pro Tools™ 7 and 8 product line.

Hardware

McDSP plug-ins support any Digidesign or approved third party hardware supported in Pro Tools™ 7.x and 8.x. This includes HD, HD Accel, 003, and Mbox host based systems. All McDSP HD plug-ins, except Synthesizer One, also support the Digidesign VENUE D-SHOW systems. See http://www.digidesign.com/compato/ for more specific information.

The McDSP Mac versions are compatible with both Intel and PowerPC based computers. The McDSP Windows versions require an Intel Pentium 4 or greater processor.*

** McDSP Windows test machines are chosen to follow the Digidesign recommended systems guide, which currently is the Dell Precision™ Workstation 670 with 2.79 GHz Xeon processor. All products are guaranteed to run on that system. Older Intel processors (i.e. Pentium III and predecessors) and AMD processors are not officially supported, although some users have had limited success with newer AMD processors (i.e. Dual Opteron 1.79 GHZ, Athlon 64 2.20 GHz, and Athlon 64 XP 3700). None of McDSP Windows product line will work with Pro Tools™ 5.x. Also note the McDSP Windows product line does not support MIX, although RTAS versions will work if they exist and the rest of your system (i.e. Pro Tools™ version and processor) is compatible.*

Please visit mcdsp.com for the latest information about compatibility.

Installing the CompressorBank Plug-In

Installation on Mac OS X

The CompressorBank plug-in Package includes this manual, ReadMe and Release Notes, a folder of presets for the CompressorBank plug-in, and the CompressorBank plug-in. Two copies of the CompressorBank Licensing Agreement are included - one in this pdf manual and a second as a separate text file. The CompressorBank plug-in manual requires that Adobe Acrobat reader (or similar .pdf reader) is installed.

Both online and boxed version will come with a CompressorBank installer that will automatically install the CompressorBank plug-in and its presets on your system. The authorization of the CompressorBank plug-in is still required after running the installer, and those steps are detailed in the following sections.

Installing the CompressorBank plug-in and presets with the Installer:

The online version of the package has been prepared for Internet delivery, and is transmitted as a compressed file in zip format (.zip). In Mac OS X 10.4.x or 10.5.x, simply double click the *.zip file to unpack the installer. The boxed plug-in package purchased at your local dealer will be on CDROM. As with the online version, these 'physical' versions of the CompressorBank plug-in package should be copied into a local folder on your system.

- Insert the McDSP 'HD Disk,' 'Native Disk,' or 'LE Disk' CDROM onto an available CDROM drive.
- Navigate to the CompressorBank plug-in folder on the CDROM - the installer application is contained therein.
- Run the CompressorBank plug-in Installer application to install (copy) the CompressorBank plug-in, presets, and documentation to a local folder on your system. The plug-in will be placed in the 'Plug-Ins' folder, and the presets will be placed in the 'Plug-Ins Settings' folder.
- If a previous version of the CompressorBank plug-in (or other HD, Native, or LE version) was already in the plug-ins folder, it will automatically be updated (or replaced) by the installer.

Re-installing the CompressorBank plug-in presets manually:

In you wish to restore the factory default presets, it may be useful to know how to manually re-install only the presets.

- Go to the 'Plug-in Settings' folder:
- Root->Library->Application Support->Digidesign->Plug-in Settings
- If Pro Tools™ has not already done so for you, create a folder called 'CompressorBank'.
- Place a copy of the folder from the CompressorBank plug-in package called 'Presets' into the 'CompressorBank' folder. The presets are now viewable (after restarting Pro Tools™) from the settings popup menu from the CompressorBank plug-in.

Note it may be necessary to re-start Pro Tools™ in order for the newly added 'Presets' folder to be viewable from the Settings popup inside the CompressorBank plug-in window toolbar.

Installation on Windows XP and Vista

The CompressorBank plug-in Package includes this manual, ReadMe and Release Notes, a folder of presets for the CompressorBank plug-in, and the CompressorBank plug-in. Two copies of the CompressorBank Licensing Agreement are included - one in this pdf manual and a second as a separate text file. The CompressorBank manual requires that Adobe Acrobat reader (or similar .pdf reader) is installed.

Both online and boxed version will come with a CompressorBank installer that will automatically install the CompressorBank plug-in and its presets on your system. The authorization of the CompressorBank plug-in is still required after running the installer, and those steps are detailed in the following sections.

Installing the CompressorBank plug-in and presets with the Installer:

The CompressorBank plug-in package purchased at your local dealer will be on CDROM and contain a Windows self extracting executable (.exe) similar to the online CompressorBank plug-in package prepared for Internet delivery. Both the boxed and online versions the CompressorBank plug-in executable file will automatically install the plug-in and its presets on your system. Double click the file to launch the installer which will install the CompressorBank plug-in, presets, and documentation. At any time after installation, you may access the documentation from the Windows 'Start Menu' under the 'McDSP' group.

Authorization of the CompressorBank plug-in is still required after running the installer, and those steps are detailed in the following sections. Note that after installing new versions of the PACE iLok drivers with the CompressorBank plug-in installer, you will be prompted by the CompressorBank plug-in installer to reboot your system. If you are not prompted by the installer, there is no need to reboot.

- Insert the McDSP 'HD Disk,' 'Native Disk,' or 'LE Disk' CDROM onto an available CDROM drive.
- Navigate to the CompressorBank plug-in folder on the CDROM - the installer application is contained therein.
- Run the CompressorBank plug-in Installer application to install the CompressorBank plug-in, presets, and documentation to a local folder on your system. The plug-in will be placed in the 'Plug-Ins' folder, and the presets will be placed in the 'Plug-Ins Settings' folder.
- If a previous version of the CompressorBank plug-in (or other HD, Native, or LE version) was already in the plug-ins folder, it will automatically be updated (or replaced) by the installer.

Re-installing the CompressorBank plug-in presets manually:

In you wish to restore the factory default presets, it may be useful to know how to manually re-install only the presets.

- Go to the Plug-In Settings folder:
- C:\Program Files\Common Files\Digidesign\DAE\Plug-In Settings\
- If Pro Tools™ has not already done so for you, create a folder called 'CompressorBank'.
- Place a copy of the folder from the CompressorBank plug-in package called 'Presets' into the 'CompressorBank' folder. The presets are now viewable (after restarting Pro Tools™) from the settings popup menu from the CompressorBank plug-in.

Note it may be necessary to re-start Pro Tools™ in order for the newly added 'Presets' folder to be viewable from the Settings popup inside the CompressorBank plug-in window toolbar.

Installation on VENUE D-SHOW systems

The CompressorBank plug-in Package for VENUE D-SHOW systems includes presets for the CompressorBank plug-in and the CompressorBank plug-in. The CompressorBank Licensing Agreement is displayed when installing the product on D-SHOW. The pdf manual can be obtained by running the Mac OS X or Windows XP/Vista version of the CompressorBank Pro Tools plug-in installer on any available computer.

Both online and boxed versions will come with a VENUE compatible installer that will automatically install the CompressorBank plug-in and its presets on your system. The authorization of the CompressorBank plug-in is still required after running the installer, and those steps are detailed in the following sections.

Note that all McDSP HD plug-ins, except Synthesizer One support the Digidesign VENUE D-SHOW system.

Installing the CompressorBank plug-in and presets on VENUE with the 'HD Disk':

The boxed CompressorBank plug-in package purchased at your local dealer will contain a CDROM titled 'HD Disk' that is specially formatted to work with your VENUE console. The VENUE installers are also available online as a compressed zip file download, however you will have to take additional steps to create your own VENUE installer CD-R, see additional instructions below before proceeding with these instructions. Both the boxed and online versions of the CompressorBank installer are the same and will install both the plug-in and its presets on your system.

Note that after installing new versions of the PACE iLok drivers with the CompressorBank plug-in installer, you will need to reboot your system. You will not be prompted to reboot, and if you don't you may see an error message saying "TPkd driver required, and a reboot. Please reboot or reinstall the software.' If you see this message, simply reboot the console and try again.

- Insert the McDSP 'HD Disk' CDROM onto the CD drive. Note that neither the McDSP 'Native Disk' nor the 'LE Disk' contains VENUE compatible installers.
- Ensure your system is in 'CONFIG' mode, you cannot install plug-ins in 'SHOW' mode.
- Navigate to the 'OPTIONS' page and then select the 'PLUG-INS' tab.
- You should now see the CompressorBank plug-in available on the left hand side.

- Select the CompressorBank plug-in and select 'INSTALL.'
- If a previous version of the CompressorBank plug-in was already installed, it will be updated by the installer.

Important note *for FilterBank HD and CompressorBank HD on VENUE D-SHOW consoles: The first time you instantiate either of these plug-ins, a dialog box will appear asking you to choose a user interface preference. Choose the Knobs interfaces, as some of the Slider interfaces are too large for the VENUE display.*

Creating a VENUE D-SHOW Installer CD-R from the online zip file:

If you do not have a boxed copy of CompressorBank with the included 'HD Disk' CDROM, you can still obtain a copy of the VENUE compatible installers from the www.mcdsp.com website. Once you have located and downloaded the latest VENUE compatible installers from the McDSP website, you will have to take several additional steps to create a VENUE compatible Installer CD-R. For your convenience, all VENUE compatible products are located in the same downloadable zip file, so you will only have to create one CD-R to install all compatible McDSP products.

- Unzip the downloaded file and locate the folder named "TDM Plug-Ins" inside the unpacked folder.
- Using any CD-R burning application, burn this folder and its contents to an ISO format CD-R. It is recommended that you use a brand new CD-R for this, and do not rewrite an older CD-R.
- Once you have burned this folder to a CD-R, you should see it at the root level of the disk (i.e. "D:\TDM Plug-Ins"). Important: If the "TDM Plug-Ins" folder is not located at the root level of the CD-R or has been renamed, the VENUE console may not properly recognize the installer disk.
- At this point, you can follow the 'HD Disk' installation instructions above to complete the installation.

CompressorBank

Using the same design approach as our popular FilterBank plug-in, CompressorBank gives the user complete control of dynamic compression. Common controls such as Output (make-up gain), Threshold, Compression (Ratio), Attack, and Release are provided. Non-standard Knee and Bite controls allow the articulation of the compression characteristics. Multiple peak detection circuit types provide flexibility only previously achieved by owning different compression units. Side chain support, side chain or in-line pre-filtering, and a static/dynamic EQ section (post compression) round out the signal processing capabilities of an already very capable compressor.

Feature List:

- **Power and Flexibility:** eight different compressor configurations are available. CB1 provides compression and side chain processing, CB2 adds pre-filtering to the input or side chain signal, and CB3 adds both pre-filtering and static/dynamic EQ. CB4 is modeled compression. See the Reference section for a complete listing of all CompressorBank configurations and their specifications.
- **Side Chain Support:** provided in all CompressorBank configurations. Side chain pre-filtering (high pass, low pass and band pass, and parametric) is also available. The pre-filter can also be placed in-line and applied to the compressed signal, and uses the same technology as in our FilterBank plug-in (including analog saturation modeling to prevent digital clipping).
- **Compression Curve Modeling:** In addition to the standard Threshold and Compression (Ratio) controls, the actual shape and response of the compression curve can be adjusted with the Knee and Bite (Bi-directional Intelligent Transient Enhancement) controls. Knee can soften the compression curve creating a smoother response, and/or add pumping/breathing compression effects. CompressorBank's unique and unprecedented Knee design allows the user to 'morph' between various compressor topologies such as the dbx 165, Neve 2254E/33609, and Teletronix LA2A. Bite gives the compressor the ability to allow signal transients (rapidly changing signals – i.e. high frequency data) to pass uncompressed, while the overall compression response is unchanged. These controls allow the user to emulate responses of their favorite vintage gear.

- **Multiple Peak Detection Circuits:** Every compressor uses a model to detect and track signal peaks and then apply dynamic compression. Variations of basic models are available in Compressor Bank: Type 1 - pure peak detection, Type 2 - pure peak detection combined with adaptive release times, and Auto - signal levels are automatically tracked.
- **Static/Dynamic EQ:** Using the same technology as in our FilterBank plug-in (including analog saturation modeling to prevent digital clipping), this parametric EQ section can be applied to the compressor output. The user can select a fixed amount of gain or a dynamic gain that tracks to the attack and release settings of the compressor. Possible effects include signal enhancement, noise reduction, and harmonic distortion.
- **Double-Precision Arithmetic:** at side chain pre-filter, compression and active EQ stages.
- **Performance:** On Pro Tools™ HD systems, the TDM version of Compressor Bank can run up to 18 mono compressors, or up to 14 stereo compressors, at 48 kHz sampling rate. On ProTools HD systems, 96 kHz and 192 kHz sample rates are also supported. CompressorBank can get up to two times (2x) the number of channels per dsp as on HD Accel.
- CompressorBank is compatible with ProTools and other DAW applications that support TDM, RTAS, and Audiosuite plug-in formats. The McDSP CompressorBank plug-in operates on Mac OS X and Windows XP systems.

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Quick Start Tour: CompressorBank

Start Pro Tools™ and instantiate the CompressorBank CB1 configuration.

- Launch Pro Tools™ and Open a Pro Tools™ Session.
- Verify the Display-> Mix Window Shows->Inserts View option is checked.
- In one of the inserts of a stereo master fader, select the CompressorBank CB1 stereo configuration. Note CompressorBank will operate on master or regular audio tracks in mono and stereo versions.
- If the insert selection does not show CompressorBank plug-ins, verify that the CompressorBank plug-in has been installed correctly.
- For more information on starting Pro Tools™ and working with plug-ins, see Digidesign's™ Pro Tools™ Reference Guide

CompressorBank CB1 Overview

The CompressorBank 1 (CB1) plug-in has the following features:

- Uniquely flexible compressor with Knee and Bite (Bi-directional Intelligent Transient Enhancement) controls
- Multiple Time-Constant (TC) circuit types
- Side chain input
- Side chain / input monitoring
- Metering of Input, Compression Gain, and Output

Compressor:

Threshold: -45 to 0 dB

Compression: 1:1 to 10:1

Knee: -10.0 to 15.0 (0 = hard knee, -10 to 0 = undershoot, 0 to 10 = overshoot, 10 to 15 overshoot with compressor 'tail')

Bite (Bi-directional Intelligent Transient Enhancement): 1.0 to 50.0 (50 = max Bite)

Compression can be triggered from input signal or side chain input

Output:

Output: +/- 24 dB

Phase Polarity Switch

- Side chain input
- Side chain / input monitoring

TC Circuit:

Attack: 0.03 msec to 250 msec

Release: 5 msec to 2.5 sec

Release2: 5 msec to 5.0 sec

TC Circuit Types:

- Type-1 - pure peak detection
- Type-2 - adaptive release
- Auto - automatic attack and release

Metering:

Input

Compression Gain

Output

CompressorBank CB2 Overview

The CompressorBank 2 (CB2) plug-in has the following features:

- All of the features of CB1
- Pre-Filter

Pre-Filter (CB2 & CB3)

Pre-Filter In/Out: Engages or bypasses the pre-filter.

Pre-Filter InLine: Places the pre-filter output in the direct signal path, so the pre-filtered signal is compressed and heard at the final output.

Filter Type: High pass, Low pass, Band pass, and Parametric.

Frequency: 20Hz to 20kHz

Q: 0.1 to 5.0

Gain: - 12 dB to +12 dB

CompressorBank CB3 Overview

The CompressorBank 3 (CB3) plug-in has the following features:

- All of the Features of CB1 & CB2
- Static/ Dynamic EQ

Static/Dynamic EQ: (CB3 only)

Gain: -24 to +12dB

Freq: 20Hz to 20kHz

Q: 0.1 to 5.0

The gain of the CB3 parametric EQ can be fixed, or dynamically track to the amount of signal present in the compressor.

CompressorBank CB4 Overview

A collection of specific compressors and limiters. Stereo versions shown below, all are also available in Mono. Although the names of other compressor manufacturers are mentioned here, they are in no way affiliated with McDSP.

Output

IN: -60 to 0 dB

OUT: -24 to +24 dB

ø (PHASE): Polarity (phase) of the final output. When yellow LED is lit, signal is 180 from original.

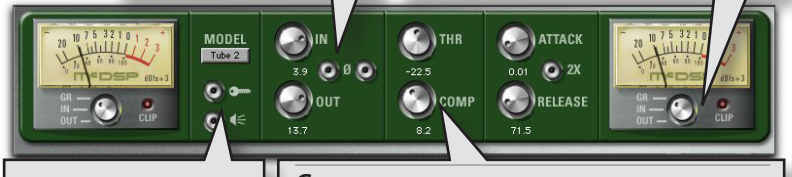
Meter

GR: Gain Reduction amount in dB

IN: Input signal amount in dB

OUT: Output signal in dB

CLIP: Lights when the signal is about to clip. The clip light can be cleared by clicking the light with the mouse.



MODEL: Chooses CB4 emulator

KEY: Selects the side chain signal

Monitor: Monitors side Chain signal

Compressor

THR: - 45 to 0 dB

COMP: 20:1 to 1:1

ATTACK: 0.01 to 10 msec

RELEASE: 50 msec to 1000 msec

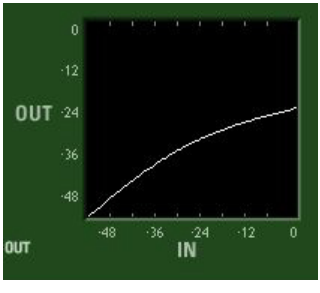
2X: Doubles the rate of the attack and release

CompressorBank CB4 Tube2

"Tube 2" is an emulation of the Manley Variable –MU. This configuration was chosen to use as an example because it contains the maximum amount of CB4 parameters.*

Diagrams and Plot Views

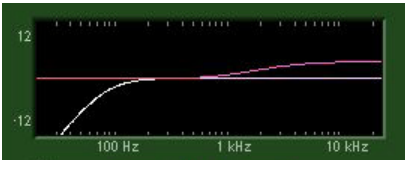
Compression Curve Graph



The Compression Curve Graph shows the Input vs. Output response (in dB) of the compressor, as determined by the Threshold, Compression, and Knee controls. A dB vs. dB grid can be displayed with the graph, by hold the <Control> key while clicking on the graph. Repeating this action will remove the grid.

The relationship between the input and output levels of the compressor are shown in the compression curve graph. For each decibel of input, a corresponding amount of output is produced. Input levels exceeding the compressor's threshold will be attenuated (compressed). Input signal levels below the threshold are unaffected.

Pre-Filter Response Graph

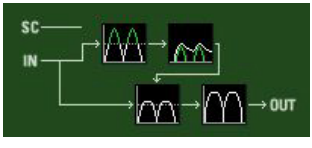


The response graph shows the pre-filter frequency response in white, along with the parametric EQ response in purple. Note the EQ response shown is the static or max-active response.

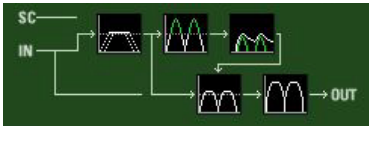
Signal Path Diagram

CompressorBank's three configurations each have their own signal path. CB1, the most basic setup, is a compressor with side chain input. CB2 adds to CB1 a pre filter section to process the original input or side chain. CB3 adds to CB2 an EQ that can remain fixed (static) or act on the signal dynamically, based on the compressor section threshold, attack and release.

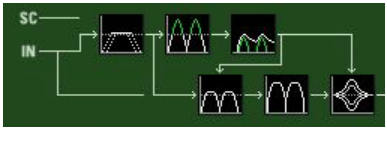
The images here are intended to give a visual to how the signal is processed. The input exceeds some threshold (green lines in first box), the exceeding input is processed by an attack and release circuit, and the result is used to create a compression gain and apply it to the input signal, and lastly the output makeup gain is applied.



The CB2 path diagram also shows the filter section.



The CB3 path diagram also shows the active/static EQ section.



Controls

Basics

To adjust any of the controls with sliders (including the pop-up sliders for Knee, Bite, Release2 and the Pre-Filter Q located 'behind' the control label itself - just click the control name), you can:

- Click and drag the sliders, or
- Hold the <Command> key while dragging the slider for fine control, or
- Click on the text box to highlight and edit the numeric value to get precise control (if a value outside the valid range is input, the control will default to the nearest allowed value when enter is hit) and hit <Enter>, or
- Click on the text box to highlight the numeric value and then use the arrow keys to increase or decrease the numeric value, or
- Use the <Option> key to bring all the controls to their default values, or
- Use hardware controller surfaces supported by CompressorBank including the Mackie HUI and Digidesign's ProControl™.

The three different TC circuit types (Type-1, Type-2, and Auto) can be selected by clicking the LED buttons next to each TC Circuit type text. Note these buttons are grouped as 'radio buttons' - only on may be selected at a time.

The compressor can be triggered by the input signal (internal key) or by an external signal (called a side chain or external key). Toggling the Side Chain LED button will enable/disable side chain input.

The input signal to the compressor (side chain or input) can be monitored by toggling the Monitor LED button.

Control Linking

To Link the Right and Left Input Controls of Stereo Versions:

- Enable the 'Lock' LED (lit is enables, unlit is disabled). The controls will be linked relative to their positions prior to enabling the 'Lock' LED. This allows both linked stereo operation and relative link operation.
- To link controls for stereo operation, set the Left and Right Input controls to equal values before enabling the 'Lock' LED. Adjust one of the left controls

and note how the right control automatically adjusts to be equal with the left control (for example, if you adjust the left gain to be equal to 6 dB, the right gain will equal 6 dB too), or

- To link controls for relative link operation, set the Left and Right Input controls to the desired offset from each other before enabling the 'Lock' LED. Adjust one of the left controls and note how the right control automatically adjusts relative to the left control (for example, if you adjust the left gain to increase by 2 dB, the right gain will increase by 2 dB. Unlike the stereo link operation, this type of linking will allow the left and right controls to have different values).
- To disable automatic linking, disable the 'Lock' LED.

A table listing all the control linking capabilities is provided in the reference section at the end of this manual.

The Meters

Each white hash mark represents a change of 3 dB; the top hash mark represents 0 dB. The input and output meters become bright green as signal is passed through the compressor, and become bright yellow as the input or output signal exceeds -6 dB in its respective meter. The Peak Meter lights when the signal is about to clip. The peak meters can be cleared by clicking on them with the mouse.

The compression gain meter is orange to distinguish its updates from the input and output meters. The amount of gain reduction is read from right to left, as the meter updates in this direction as compression gain is applied to the input signal.

Note how when the output gain is 0 dB (unity) the input and compression gain meters can be added to equal the current output level in the output meter. This is a good way to develop an understanding of how compressors operate.

Stereo versions of the CompressorBank configurations have two input and two output meters, but still only one compression gain meter. Stereo versions of CompressorBank base their compression gain on a composite signal derived from the current left and right input signal levels.

User Interface Preference Setting

CompressorBank comes with four User Interface (UI) sets. The original slider based UI is the default settings preference. The other three preferences are an expanded slider based UI with graphic displays, a knob based UI, and a knob based UI with graphic displays. These UI preferences are discussed in further detail in the sections below.

When CompressorBank is loaded during ProTools launch - a dialog is displayed asking the user what is to be the UI preference for CompressorBank. CompressorBank will solicit the UI preference from the user upon first use. Should the user wish to modify their UI preference, they may do so by inserting any CompressorBank plug-in on a track, pressing the <U> and <I> keys immediately after the plug-in has been selected from the insert menu.When the session is closed, the CompressorBank plug-in saves which UI type was last used as a preference.

Alternate Knob User Interface

CompressorBank also comes with a complete set of knob based UIs. The knobs can be operated by clicking and dragging the mouse left/right or up/down. Note the mouse movement is 'locked' to the left/right or up/down movement once the mouse position goes outside of the knob graphic. This reduces control 'jitters' significantly, and allows the knob to be functionally equivalent to a slider. As with the sliders, holding the command key while adjusting the knob will allow fine control, and clicking the knob while holding the option key will return the knob to its default value.

Expanded Alternate User Interface

All the configurations of CompressorBank have an expanded User Interface (UI). This larger UI shows the signal flow through the compressor, the compression curve, and the frequency response of the Pre-Filter and Static/Dynamic EQ section. The expanded UI is available for slider and knob based UI sets.

Automation

All CompressorBank Controls are completely automatable. See the Digidesign ™ Pro Tools™ Reference Guide, Automating plug-ins section. Here are a few tips about automating the stereo versions of CompressorBank configurations:

- If stereo or linked automation is desired for a left/right control pair, you only need to automate ONE of the left/right control pair. The stereo or link offset is preserved during automation playback. You may automate both left and right controls simultaneously, however the automation data is simply duplicated in the left and right control pair.
- If discrete automation is desired for a left/right control pair, then the CompressorBank control mode 'Lock' LED should be disabled. This will allow each left/right control to operate independently, and not also send automation events to each other as is the case when the CompressorBank 'Lock' LED is enabled.

Using the Presets and Making Your Own

The CompressorBank presets are inspired by compressors such as the UREI 1176 LN, Teletronix LA2A, Neve 2254E/33609, Avalon Designs 2044, Empirical Labs EL8 Distressor, dbx 165, and Altec Lansing 9473A. A variety of other presets are named for their application ('vocal', 'drums', 'guitar'). The presets can be accessed from the Pro Tools™ "plug-in Librarian" and "plug-in Settings" pop-up menus.

To make and save your own presets, see the "plug-in Librarian Functions" section of Digidesign™' s DigiRack plug-ins Guide.

A Word on Preset Compatibility: Presets for the CB1, CB2, and CB3 configurations are interchangeable. For example, a preset created with a CB1 can be used in a CB2 and CB3 (mono and stereo). However, some of the controls in CB2 and CB3 are not available in CB1, just as some controls are not available in CB2 that are in CB3. If a preset has not affected any controls on the UI, it is because the controls that differed from the current ones on the CB configuration the user has switched to are not present in that CB configuration's UI. If an incompatible preset is used, such as a FilterBank EQ preset, CompressorBank will display a warning message accompanied by a system beep and retain the control settings before the preset was applied.

The additional 'Modeled Comrpessor' CB4 makes use of a different preset format, and its presets are not compatible with other CompressorBank configuration, nor are other CompressorBank configuration presets compatible with CB4.

For more information, see the section on Modeling Analog Compressors.

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Using CompressorBank

Output

All CompressorBank configurations come with an Output stage. When a signal is compressed, the maximum signal level is reduced. Compressors provide a 'make-up' gain to allow the signal level to be returned to its previous level (or other desirable level). The polarity, or phase, of the signal can be altered at this stage as well by enabling/disabling the 'Ø' LED. The phase of the signal is unaffected when the 'Ø' LED is off.

The 'make-up' gain control is useful in amplifying low level signal levels, such as room ambience, while the compressor reduces signal peaks that would have otherwise been masking such sounds.

External Key Enable and Key Listen

The signal that drives the compressor is often called the 'compression key'. It is typically the input signal to the compressor that is processed and heard at the output. There are compressor applications where the input signal is compressed based on the changes in another separate signal, or side chain. An example of such an application would be dialog 'ducking', where the overall program - music, background sounds, etc. would be reduced in level when ever the speaker began talking/singing.

The External Key Enable control allows the user to select between the input ('internal key') or side chain input ('external key') as the compression key. When the key LED is lit, the external key is being used, else the internal key is being used.

The Key Listen control allows the user to monitor the input signal into the compressor, whether it is an internal or external key. This is useful in comparing the processed signal to the original. Note that if an external key is selected to drive the compressor, that signal will be heard at the compressor output should Key Listen be enabled. When the Key Listen LED is lit, key listening is enabled.

Note that when Key Listen is enabled in CompressorBank configurations with a Pre-Filter section, the monitored signal is the output of the pre-filter.

Compressor

The compression section of CompressorBank is comprised of 4 controls - Threshold, Compression, Knee, and Bite (Bi-directional Intelligent Transient Enhancement).

- Threshold: the signal level above which the compressor is engaged. Audio below this level will not be compressed. Audio above this level will be compressed by the amount the signal is above the threshold level.
- Compression: the amount of compression, also known as the compression ratio. As audio exceeds the threshold level, it is compressed by an amount determined from this control. This is illustrated in the example below: Example:

Threshold =	-12 dB
Compression =	4.0 (4:1 compression ratio)
Signal Level =	0 dB

The signal level is above the threshold by 12 dB. This amount is compressed at a ratio of 4:1, to 12 / 4 = 3 dB. The new compressed signal level is then -12 dB + 3 dB = -9 dB.

When a stereo compression configuration is used, the maximum of the left and right input channels is used as the compressor input.

- Knee: the smoothing of the compression response immediately below and above the threshold level. The effect of the knee control is best understood by displaying the CompressorBank alternate expanded user interface. The Knee control has three ranges of values - undershoot range is -10 to 0, overshoot range for 0 to +10, and overshoot with compression 'tail'. The undershoot range creates a smoothed transition from unity gain (1:1 compression ratio) to the selected compression ratio. This effect emulates the trademarked 'over easy' compression curves of the dbx compressors. The overshoot range allows the compressor to 'miss', or 'overshoot' the desired compression ratio and ultimately recover to a linear compression curve. This effect creates pumping/breathing effects found in such compressors as the Neve 33609C. The overshoot and 'tail' range continues the overshoot response, and adds a compression 'tail'. This 'tail' reduces compression ratios for signals that greatly exceed the compression threshold. Such an effect gives compressed signals more 'presence' or 'top-end' as some strong signal transients are allowed to pass with less gain reduction from the compressor. Such characteristics are common in devices like the Teletronix LA2A and other

'opto-compressors'.

It is important to note how these three variations of knee control transition smoothly from one to the other. New and unprecedented compression techniques are available only in CompressorBank. The user can choose different knee shapes, even changing compression paradigms (from a dbx 165 to a Neve 33609), in a single continuous control change.

- Bite: the Bi-directional Intelligent Transient Enhancement control gives the compressor…well…more 'bite'. As this control is increased, fast signal changes (transients) are allowed to pass through the compressor while the overall compression amount is the same. The transients of a compressed signal will become less compressed as more 'bite' is applied. This control is useful in emulating the response of analog compressors.

Attack and Release

Compressors use a circuit to track the signal changes over time as they exceed the threshold control level. Such circuits have time constants (attack and release) to articulate the response of the circuit to signal changes (hence the term 'time constant' circuit, or TC circuit). These circuits, in conjunction with the compressor controls, shape the overall sound of the compressor. CompressorBank is unique because it gives the user multiple variations on these circuits. The Time-Constant (TC) Circuit section of CompressorBank is comprised of 4 controls: Attack, Release, Release2, and TC Circuit Type.

- Attack: the rate at which the compressor responds to signals as they rise above the threshold. A fast attack can track, even sample-by-sample, the changes in the signal data. Note that such a fast setting can introduce unwanted 'gain cogging' (in analog or digital domains!) as the compressor response sounds erratic as it changes with every signal nuance.
- Release: the rate at which the compressor responds to signals as they fall back to and below the threshold level. A fast release can track, almost sample-by-sample, the changes in the signal data. Note that such a fast setting can introduce unwanted 'gain cogging' (in analog or digital domains!) as the compressor response sounds erratic as it changes with every signal nuance.
- Release2: the secondary rate at which the compressor responds to signals as they fall back to and below the threshold level. This secondary release control is available only in the Type-2 TC circuit, and is used to 'fine tune' the overall release response. Note that when using Release and Release2 concurrently, the overall release time is faster than indicated by either release

control. Setting Release2 to its maximum release time of 5.0 seconds makes its effect on the release response negligible.

- TC Circuit Type: selects the TC circuit algorithm - Type-1: Pure Peak Detection, Type-2: Adaptive Release, and Auto: Automatic attack and release based on signal data. Note when the Auto TC circuit type is selected, the Attack and Release (and Release2) controls have no effect.

Time Constant Circuits

CompressorBank has two types of Time Constant (TC) circuit algorithms to emulate the TC circuit responses (and hence sound) of other compressors. There are two types of user controllable curves:

- Type-1: Pure Peak Detection - the release response is unaffected by new signals if those signal levels are below the current release level.
- Type-2: Adaptive Release - the release response is affected by new signal regardless of the signal level relative to the current release level.

The Release2 control that allows further manipulation of the release response, and is available when using the Type-2 release curve. Because both Release and Release2 control operate independently and concurrently, care should be taken when operating both. If, for example, the Release2 response is decreased to an amount equal to the main Release control, the overall release will be even faster. For this reason, the default control value for Release2 is 5.0 seconds, which makes the control's effect on the release curve negligible.

Figure 4.1 shows the Type-1 (green) and Type-2 (blue), as well as the affect of decreasing the Release2 control (purple).

As shown in the Type-1 (green) line in Fig 4.1, a second signal spike (red) does not alter the release response. The green line continues to decay unaffected by the new signal information because the new signal level is below the release signal level. In the Type-2 (blue) line the new signal affects the release level, even though the new signal level is below the release level. The Type-2 w/ Release2 added (purple) line total release time becomes shorter as the Release2 control is increased. Note how this response can even produce release times faster than the original release as Release2 is equal to or less than Release.

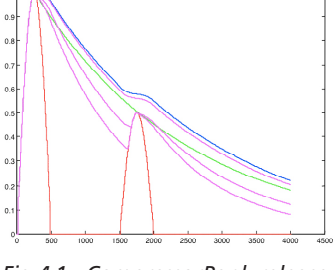

Fig 4.1 - CompressorBank release curves

Pre-Filter

The CompressorBank CB2 and CB3 configurations have an input pre-filter select the frequency range of the signal used to trigger the compressor. The pre-filter section is derived from the same technology in our FilterBank plug-in, including analog saturation modeling and 48-bit internal precision. Many high-end compressors make use of a fixed pre-filter section. CompressorBank gives the user total control over filter parameters:

- Pre-Filter In/Out: engages or bypasses the pre-filter.
- Pre-Filter InLine: places the pre-filter output in the direct signal path, so the pre-filtered signal is compressed and heard at the final output.
- Filter Type: selects the filter type used to pre-filter the input into the compressor. Available types are high pass, low pass, and band pass, as well as parametric.
- Frequency: controls the cut-off frequency of the pre-filter. For high and low pass filters, the signal level is -3 dB at the selected frequency. For the band pass filter, the signal level is 0 dB at the selected frequency.
- Q: controls the amount of overshoot/undershoot of the filter response in high and low pass filters, and the bandwidth of the band pass filter (Q = 1/bandwidth). For high and low pass filters, the 'critical' Q value at which no overshoot/undershoot occurs is 1.4, the default of the Q control. For 0.1 < Q < 1.4, the filter will overshoot. For 1.4 < Q < 5.0, the filter will undershoot.
- Gain: controls the amount of cut or boost when the parametric pre-filter type is selected. The Gain control range is +/- 12 dB. Note how the Q range when used with the parametric EQ is even greater than on our FilterBank plug-in!

The high pass filter in Fig 4.2 shows three different ranges of Q - overshoot (0.1 < Q < 1.4) is in red, undershoot (1.4 < Q < 5.0) in green, and critically damped (Q = 1.4) in blue. These same responses are attainable in the low pass filter of CompressorBank's pre-filter section as well. Effects such as resonant filtering, super bass, and a variety of cut/emphasis settings can be created.

Note when monitoring the input signal to the compressor in CB2 and CB3 configurations, the passed signal is the output of the Pre-Filter. This is done so the user can listen to the signal feeding the compressor, which in the CB2 and CB3 configurations is the output of the pre-filter.

Static/Dynamic EQ

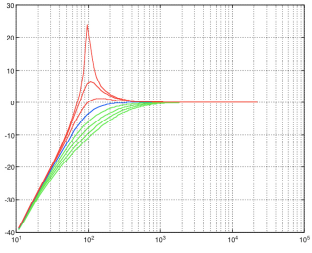

Fig 4.2 - CompressorBank high pass filter curves

The CompressorBank CB3 configurations have a parametric EQ section for more control over the frequency response of the compressor. The parametric EQ section is derived from the same technology in our FilterBank plug-in, including analog saturation modeling and 48-bit internal precision. Additionally the gain of the CB3 parametric EQ can be fixed, or dynamically track to the amount of signal present in the compressor. This dynamic gain uses the same attack and release times as set in the compressor already, so the dynamic gain follows the amount of compression. The parametric section is placed at the output of the compressor (post-compression), and has gain, frequency, and Q controls.

- Gain: The gain control adjusts the amount of boost or cut applied to the signal.
- Freq: The frequency control adjusts the point in the frequency spectrum where the parametric band gain is applied. The signal amplitude at the frequency set by this control is equivalent to the amplitude set by the gain control. All parametric sections are completely overlapping - the frequency range of each extends to the top and bottom of the frequency spectrum.
- Q: The width of the parametric band, the bandwidth, is controlled by the Q control. Q = 1/bandwidth. Large values of Q correspond to narrow bandwidth, small values of Q correspond to wide bandwidth. CompressorBank Q ranges meets or exceeds most other parametric equalizer implementations (in fact we even exceed the upper Q range of FilterBank!). McDSP Q uses proprietary constant-Q technology to maintain an analog response through the entire frequency spectrum. Also note when the Q control is set to its lowest setting (0.1, i.e. 10 octave bandwidth), the equalizer response approaches that of a very smooth low or high shelf filter when the frequency control is set to extreme low and high frequency settings. This is a common characteristic in high-end parametric equalizers.

The applications of the dynamic EQ include de-essing, signal enhancement, and harmonic distortion. The next section of this manual, 'Modeling Analog Compressors with CompressorBank', illustrates some of these uses of dynamic equalization.

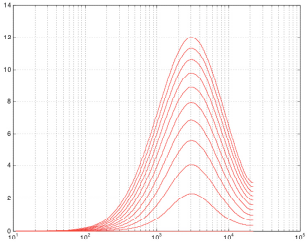

Fig 4.3 - CompressorBank dynamic EQ

Modeling Analog Compressors with CompressorBank

CompressorBank models a wide variety of vintage and contemporary compressor implementations. This section highlights how CompressorBank is used to model some of these analog implementations. The user is additionally directed to various presets included in the CompressorBank plug-in package.

Each of the following sections contains graphs representing the responses of analog gear, as measured by the engineering staff at McDSP. Although the names of other compressor manufacturers are mentioned in this chapter, they are in no way affiliated with McDSP.

CompressorBank presets are inspired by compressors such as the Urei 1176 LN™, Teletronix LA2A™, dbx 165™, Neve 33609C™, Avalon Designs 2044™, Empirical Labs EL8 Distressor™, and Altec Lansing 9473A™. The presets can be accessed from the Pro Tools™ "plug-in Librarian" and "plug-in Settings" pop-up menus.

To make and save your own presets, see the "plug-in Librarian Functions" section of Digidesign™'s DigiRack plug-ins Guide.

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Teletronix LA2A™

Made first in Sunnyvale CA (not far from McDSP headquarters), this peak limiter has become one of the most sought after devices in music production. The LA2A, as well as other pure class A opto-compressors, are characterized by their soft knee and compression 'tail'. This gives the compression response more 'presence' in the mix as the amount of compression actually decreases when enough signal is driven into it to reach the 'tail'.

CompressorBank's Knee control range of +10 to +15 is designed specifically to emulate the LA2A and other contemporary opto-compressors. At a Knee of +10, the transition from 1:1 to X:1 compression is already very large. As the Knee control is increased to +15, the compression 'tail' is created.

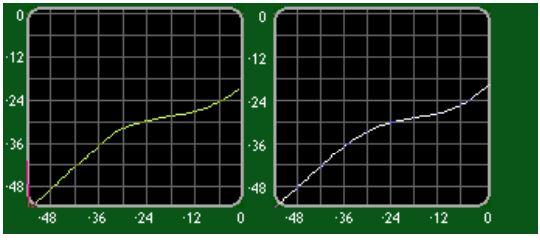


Fig 4.4 - Teletronix LA2A (left) and CompressorBank (right)

The compression 'tail' is seen in Fig 4.4 between -12 dB and 0 dB. McDSP engineering also had the opportunity to evaluate an LA2A with the compressor/limiter switch modification, and the LA3A. These measurements, and the ones in Fig 4.4 above were used to create the 'LA too, eh?' presets.

UREI 1176 LN™ (blackface)

The UREI 1176 LN (1176 for short) was one of the first classic compressors to offer user adjustable attack, release, and compression ratio controls. Alleged to be superior to later production models, the 'blackface' front panel version is the 1176 edition measured by McDSP engineering.

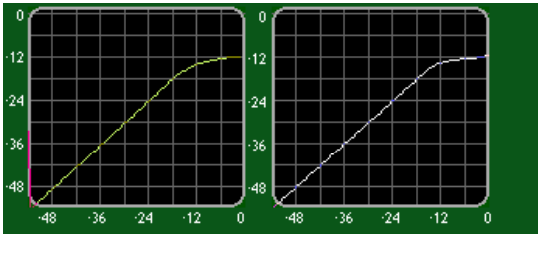


Fig 4.5 - UREI 1176 LN blackface (left) and CompressorBank (right)

CompressorBank's Knee control range of 0 to +10 models the 1176 knee shape nicely. The possible compression ratios of 4, 8, 12, 20, and '44' have been

measured and transformed into CompressorBank presets called 'blackface'.

The modeling of the 1176 also shows how the CompressorBank compression bands can be setup to have a compression ratio much greater than its apparent 10:1 maximum. By using the Knee control (0 to +10) and Compression control interactively, a flat compression curve can be created easily. These controls, combined with the fastest attack setting (0.03 msec, i.e. one sample) make for a great brick wall limiter.

Neve 2254E/33609™

Originally part of larger Neve consoles, the 2254E compressor/limiter was made into a two channel stand-alone unit called the 33609C. The 33609 unit was evaluated at McDSP. Measured compression and limiter curves showed how the 33609 has the potential to create classic pumping/breathing effects due to a subtle overshoot in the compression knee.

Using the Knee control (0 to +10 values), CompressorBank models this behavior very closely. In fact, this part of the CompressorBank knee curve was designed to specifically emulate the 33609 compression response.

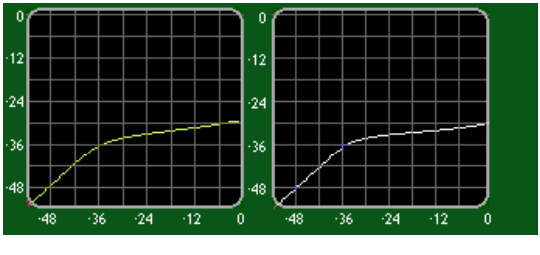


Fig 4.4 - Neve 33609 (left) and CompressorBank (right) at 6:1 compression

Note how the overshoot portion of CompressorBank's Knee control can create a knee size less than, equal to, or greater than the 33609. This is a good demonstration of the modeling accuracy and flexibility of the CompressorBank compression bands.

The 33609 limiter has a similar knee overshoot characteristic as its compressor. Use of the Knee control can setup the CompressorBank compression bands to function as a brick-wall limiter, as shown below in the emulation of the 33609.

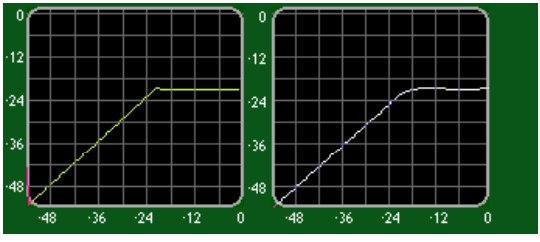


Fig 4.5 - Neve 33609 Limiter (left) and CompressorBank (right) limiter emulation

Using CompressorBank's Knee control to create an overshoot realizes a compression curve with a nearly flat, or brick-wall response. The smooth transition (seen in Fig 4.2 between -24 dB and -18 dB) makes the limiting as transparent as possible. Again the flexibility of the CompressorBank compression bands provides another useful dynamic range control application.

Presets in the CompressorBank plug-in package derived from these models are called 'British Comp' and 'British Limiter'.

dbx 165™

The dbx 165, like other dbx compressors, is known for its 'over easy' trademarked compression sound. Using CompressorBank's Knee control (-10 to 0) captures this characteristic very well.

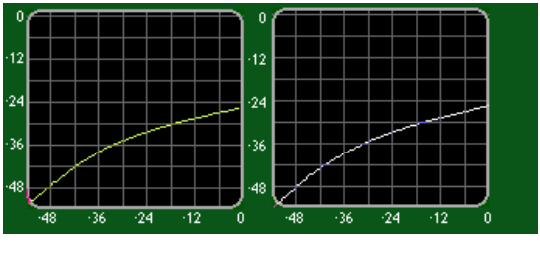


Fig 4.6 - dbx165 (left) and CompressorBank (right) at 4:1 compression

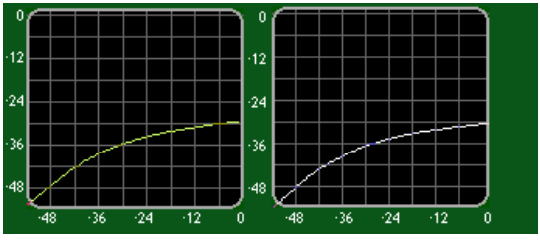


Fig 4.7 - dbx165 (left) and CompressorBank (right) at 6:1 compression

The transition from an un-compressed sound (1:1) to the selected compression ratio (4:1 and 6:1 above) is very gradual, to the point of obscuring the compressor threshold. Such a response allows the compressor to be transparent, even when applying a significant amount of compression.

Additional emulation of the dbx 165 is accomplished by using CompressorBank's Bite control. Instead of manipulating CompressorBank's attack control, the Bite control was used instead to approximate the corresponding dbx 165 attack control. The Attack control can be set anywhere from 10 to 50 msec during such operation.

Presets in the CompressorBank plug-in package derived from these models are called 'Old Smoothie'.

Avalon Designs AD2044™

Avalon Designs specializes in contemporary implementations of high-end audio gear emulating the sounds of classics of earlier eras. The AD2044 is a Pure Class A Opto-Compressor. The AD2044 compressor is very smooth and nearly transparent with few characteristics imparted into the audio. The transition from 1:1 compression to X:1 compression is achieved by a medium knee and moderate attack and release settings.

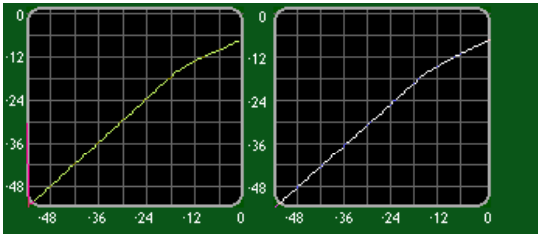


Fig 4.8 - AD2044 (left) and CompressorBank (right) at 2:1 compression

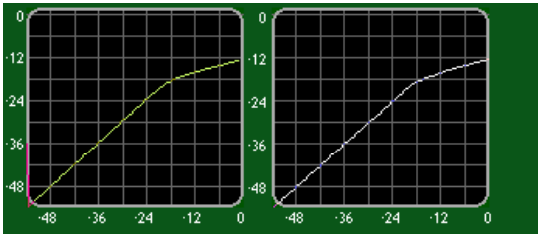


Fig 4.9 - AD2044 (left) and CompressorBank (right) at 5:1 compression

Lowering the threshold of the AD2044 reveals the same type of compressor 'tail' as found in the Teletronix LA2A.

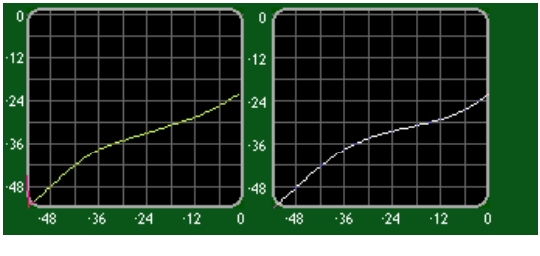


Fig 4.10 - AD2044 (left) and CompressorBank (right) w/ 'tail'

CompressorBank plug-in presets derived from these models are titled 'Class A Opto xx'.

Other CompressorBank Presets

Several other presets have been included in your CompressorBank package. These settings were created to highlight the flexibility and utility of CompressorBank. Presets include effects such as signal enhancement, compression pumping, noise reduction, de-essing. Other application specific presets are given names such that their use is easily understood, such as 'vocal', 'dialog', 'drums', etc.

CompressorBank is the most flexible compressor on the planet.

We hope you enjoy using it as much as we did creating it!

CompressorBank Plug-In Reference Guide

CompressorBank CB1, CB2 & CB3 Specifications

Parameter	Settings	Function
OUTPUT	-24 to +24 dB	Amount of make-up gain applied to master signal.
LOCK	ON/OFF	Locks right and left OUTPUT controls (stereo configurations only)
Ø (PHASE)	ON/OFF	Polarity (phase) of the final output. When yellow LED is lit, signal is 180 from original.
KEY	ENGAGED/ DISENGAGED	Selects the side chain signal to cause the Compressor to begin reducing signal dynamics range once it exceeds the selected threshold.
INPUT OR OUTPUT METERS	-60 to 0 dB	Output level of band. Meters below COMPRESSION GAIN METER, displayed in green and reading from left to right. Red LED's are lit to indicate output has clipped. Click LED to clear. Selected in the Master Section "METERS"
Compressor		
IN	ON/OFF	Compressor enable/disable. Red LED is lit when band is enabled.
THRESHOLD	- 45 to 0 dB	Level at which the compression starts. Also indicated by orange triangle on OUTPUT METER.
COMPRESSION	10:1 to 1:1	Ratio of input to output levels for compressor. As input exceeds the THRESHOLD, it is compressed by an amount determined by this control.
KNEE	-10.0 to 15.0	The smoothing of the compression response immediately below and above the threshold level. See COMPRESSION DISPLAY for visual display of differences. -10 to 0 = undershoot 0 = hard knee 0 to 10 = overshoot 10 to 15 = overshoot with compressor 'tail'
BITE	1.0 to 50.0	Bi-Directional Intelligent Transient Enhancement. As this control is increased, fast signal changes (transients) are allowed to pass through the compressor while the overall compression remains the same.
ATTACK	0.03 to 250 msec	The rate at which the compressor responds to signals as they rise above the THRESHOLD.
RELEASE	5.0 msec to 2.5 sec	The rate at which the compressor stops responding to signals as they fall below the THRESHOLD.

Parameter	Settings	Function
AUTO	ON/OFF	Automatic ATTACK and RELEASE. When AUTO mode is enabled, Yellow LED is lit and ATTACK, RELEASE, and RELEASE2 controls are disabled.
TYPE	Type-1, Type-2	Time Constant Circuit Type. Type-1 indicates the standard pure peak detection and Type-2 indicates a more advanced adaptive release based on multiple signal peaks.
RELEASE2	0.005 to 5.0 sec	The secondary rate at which the compressor stops responding to signals as they fall below the THRESHOLD. Only active when Type-2 TC CIRCUIT TYPE is selected.
Pre-Filter (CB2 & CB3 only)		
PRE-FILTER IN/ OUT	-60 to 0 dB	Engages or bypasses the pre-filter.
INLINE	l overshoot. For 1.4 < Q < 5.0, the filter will undershoot	Places the pre-filter output in the direct signal path, so the pre-filtered signal is compressed and heard at the final output.
FILTER TYPE	High Pass Low Pass Band Pass Parametric	
FREQUENCY	20Hz to 20kHz	The center frequency of the filter.
Q	0.1 to 5.0	The width of the parametric EQ bell, 1 = One full Octave.
GAIN	-12dB to +12dB	The amount of boost or cut in dB for each EQ band.
Static/Dynamic EQ: (CB3 only)		
FREQUENCY	20Hz to 20kHz	The center frequency of the EQ.
Q	0.1 to 5.0	The width of the parametric EQ bell, 1 = One full Octave.
GAIN	-24dB to +12dB	The amount of boost or cut in dB for each EQ band.

CompressorBank CB4 Specifications

Parameter	Settings	Function
MODEL	See reverse side of this card	
KEY	ON/ OFF	Selects the side chain signal to cause the Compressor to begin reducing signal dynamics range once it exceeds the selected threshold
OUTPUT	-24 to +24 dB	Amount of make-up gain applied to the master signal
Ø (PHASE)	ON/OFF	Polarity (phase) of the final output. When yellow LED is lit, signal is 180 from original.
IN	-24 to +12 dB	Amount of input gain applied prior to compression
THRESHOLD	- 45 to 0 dB	Level at which the compresson starts
COMPRESSION	1:1 to 20:1	Ratio of input to output levels for compressor. As input exceeds the THRESHOLD, it is compressed by an amount determined by this control
ATTACK	0.01 to 10 msec	The rate at which the compressor responds to signals as they rise above the THRESHOLD
RELEASE	50 to 1000 msec	The rate at which the compressor stops responding to signals as they fall below the THRESHOLD
2X	ON / OFF	Doubles the rate of the ATTACK and RELEASE
Meter		
GR	Gain Reduction	Gain Reduction amount in dB
IN	Input	Input signal amount in dB
OUT	Output	Output signal in dB
CLIP	LED	Lights when the OUTPUT is about to clip. Clear by clicking with the mouse.

CompressorBank CB1

Compression and side chain processing.

CB1 Sliders (Stereo)

CB1 Sliders with Plot View (Stereo)

CompressorBank CB1

Compression and side chain processing.

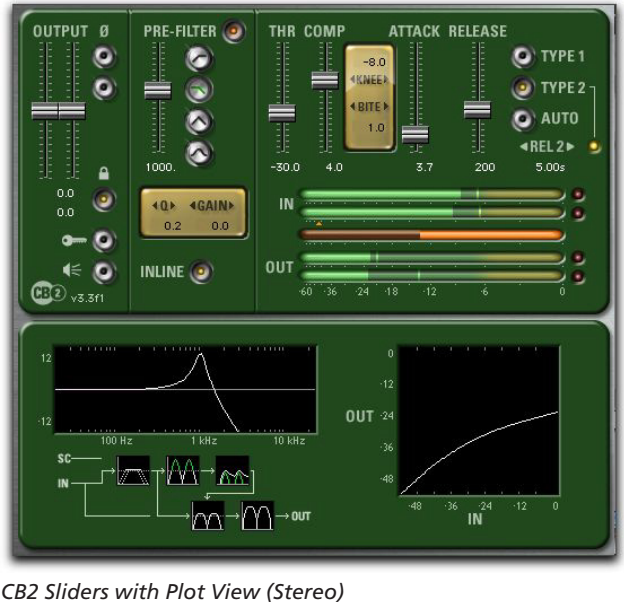
CB1 Knobs (Stereo)

CB1 Knobs with Plot View (Stereo)

CompressorBank CB2

Adds pre-filtering to the input or side chain signal

CB2 Sliders (Stereo)



CB2 Sliders with Plot View (Stereo)

CompressorBank CB2

Adds pre-filtering to the input or side chain signal

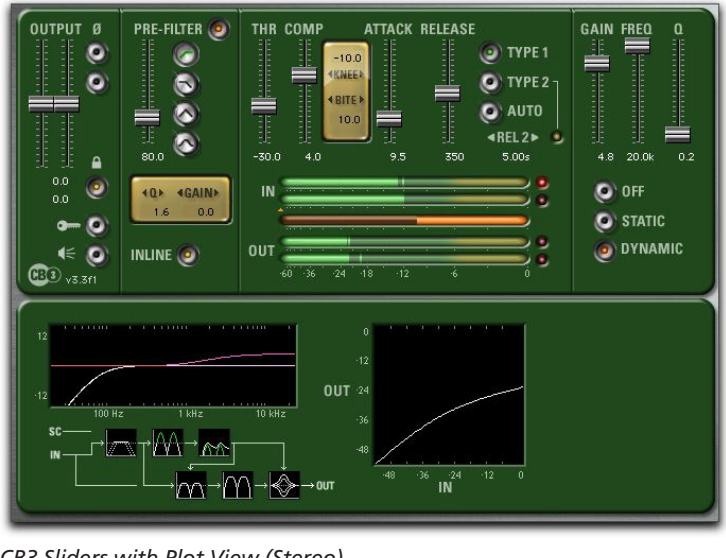
CB2 Knobs (Stereo)

CB2 Knobs with Plot View (Stereo)

CompressorBank CB3

Adds both pre-filtering and static/dynamic EQ

CB3 Sliders (Stereo)



CB3 Sliders with Plot View (Stereo)

CompressorBank CB3

Adds both pre-filtering and static/dynamic EQ

CB3 Knobs (Stereo)

CB3 Knobs with Plot View (Stereo)

CompressorBank CB4

The CompressorBank CB4 plug-in is a collection of famous compressor and limiter models, in both mono and stereo configurations. Although the names of other compressor manufacturers are mentioned here, they are in no way affiliated with McDSP..

British

*"British" is an emulation of the Neve 33609**

Opto-C

"Opto-C" is an emulation of the Teletronix LA-2A in compression mode*

Opto-L

"Opto-L" is an emulation of the Teletronix LA-2A in limiting mode*

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CompressorBank CB4

Over EZ

*"Over EZ" is an emulation of the dbx165**

S-State

*"S-State" is an emulation of the UREI 1176**

Tube

*"Tube" is an emulation of the Fairchild 670**

Tube2

*"Tube 2" is an emulation of the Manley Variable –MU**

Linked Control Table

CompressorBank provides a variety of linked control functionality in its many configurations. The table below lists all the linking capabilities as of the v1.0 version of CompressorBank. For more information on control linking, see the Control Linking section of the Quick Start Tour.

LINKED CONTROLS	LINK ACTION	LINK TYPE
Left/Right Output controls	Enable the 'Lock' LED in the Master section.	Absolute or Relative

DSP Delay

The delay is 1 sample on HD systems. There is a 2 sample delay from the TDM connection to the CompressorBank plug-in. This is the absolute minimum number of delay samples a TDM plug-in can have. The McDSP plug-ins are designed in this manner to provide the user with the closest analog mixing console experience possible (analog inserts such as EQ and compression do not cause a processing delay when inserted into a track).

DSP Usage

HD, and HD Accel DSP hardware

The TDM versions of the CompressorBank plug-in configurations use a varying amount of dsp resources for each CompressorBank configuration. The table below is a listing of these dsp usages. The DSP Allocator utility provided by Digidesign™ may be used to display dsp resource allocation when Pro Tools™ is running.

Maximum Instantiation Counts at 48kHz

CONFIGURATION	# INSTANTIATIONS PER DSP ON HD SYSTEMS	# INSTANTIATIONS PER DSP ON HD ACCEL SYSTEMS
CB1 (MONO)	8	15
CB1 (STEREO)	5	12

CONFIGURATION	# INSTANTIATIONS PER DSP ON HD SYSTEMS	# INSTANTIATIONS PER DSP ON HD ACCEL SYSTEMS
CB2 (mono)	5	13
CB2 (stereo)	3	8
CB3 (mono)	3	9
CB3 (stereo)	2	5
CB4 (mono)	3	9
CB4 (Stereo)	2	5

Many of the CompressorBank plug-in configurations can operate on the same DSP, depending on the configuration's DSP requirements. See below for the percentages of a HD or HD Accel DSP used by a single instantiation of a CompressorBank plug-in.

CompressorBank supports all higher sample rates (96 kHz and 192 kHz). However due to the DSP usage of some of the larger CompressorBank configurations, not all configurations are available at the higher sample rates. For 96 kHz operation the DSP usage is doubled (x 2), and for 192 kHz operation, the DSP usage is quadrupled (x 4).

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CompressorBank Frequently Asked Questions

For an updated list of Frequently Asked Questions, see our website:

www.mcdsp.com/FAQ.html.

How is CompressorBank different from other Compressors?

- CompressorBank gives you the most power and flexibility to emulate any other compressor (and many limiters) or create your own custom compressor/limiter.
- Consider first the number of configurations you get in this one plug-in: compression with side chain input (CB1), compression with side chain input and pre-filtering (CB2), and compression with side chain input, pre-filtering and static/dynamic EQ all in stereo and mono configurations.
- Consider next, the maximum number and ranges of the independent controls available to the user to define the compression response curve. Our design philosophy is maximum user control, and here is the proof of our concept:
    - Standard compression controls - compression (ratio), threshold, and output (make-up gain) - allow only the most basic manipulation of the compression response.
    - Non-standard compression controls - Knee and Bite - give the user complete control over the articulation of the compression curve. The Knee control smooths the transition from 1:1 output to a compressed output. The Bite (Bi-directional Intelligent Transient Enhancement), control gives our compressor the ability to pass fast signal changes (transients) while maintaining the overall compression level. Both these controls are critical in the control of the over-all compression response, and allow CompressorBank to emulate other vintage and modern compressors.
    - Pre-Filtering is common on many high-end compressors. CompressorBank's pre-filter is totally adjustable - frequency, Q, and filter types (high pass, low pass, and band pass, and parametric EQ) controls are provided. The pre-filter uses the same technology from FilterBank - including analog saturation modeling and 48 bit processing - to realize a great sound all on its own.

- Total UI feedback is readily apparent in the alternate expanded CompressorBank interface. The signal flow diagram, pre-filter and static/dynamic EQ response curves, and compressor response curve let the user experience the processing visually.
- Static/Dynamic EQ - again using the FilterBank technology to achieve the great FilterBank sound. Additionally the EQ gain can track to the signal level in the compressor as controlled by the compression attack and release values. This EQ can be for signal enhancement, de-essing, harmonic distortion, and other effects to compliment the great compression algorithms in CompressorBank.

- CompressorBank is a high-end compressor with:
  - Double Precision Arithmetic which keeps the noise floor at -138dB. In contrast, it is possible for single precision arithmetic processors to raise the noise floor significantly above -138dB.
  - Analog Saturation Modeling in the Pre-Filter and Static/Dynamic EQ sections that prevents digital clip, and
  - A minimum of 15 mono or 12 stereo channels of compression per HD Accel dsp - compare this to the typical 1 or 2 per hardware box!

What is Double Precision Arithmetic and why it is important:

The TDM bus is a 24 bit audio-signal path with a dynamic range of 138 dB. CompressorBank's internal double precision (48 bits) keeps the noise floor of its outputted signal at -138 dB. In contrast, with single precision (24 bit) arithmetic, the noise floor of a digital effect process can be dramatically higher than the -138 dB noise floor you would expect from a 24 bit data path. Such adverse affects would be seen as DC offset in output meters, even when there was no audio being processed. Small amounts of such noise reduce the quality of 24 bit audio data.

What is Analog Saturation Modeling and why you want it:

Analog Saturation Modeling prevents pure digital clip that can ruin a mix. Instead, analog saturation modeling will approximate the sound of an analog box driven to a clipping state.

You can test CompressorBank's saturation modeling applying the maximum gain (max gain on the static/dynamic EQ, or the minimum Q on a high or low pass pre-filter) to a relatively hot signal. This choice of input and setting creates ideal conditions for digital clipping. However, note that CompressorBank will not produce digital clipping, but will instead saturate and sound like an overloaded analog EQ. The point of this example is that even with extreme input, CompressorBank will not produce a digital clip and will emulate the much preferred analog sound.

What CompressorBank presets are available?

Presets emulating a number of popular compressor sounds are included with CompressorBank, and are found in the 'Presets' folder in the CompressorBank package. These presets were created from measurements taken at McDSP headquarters while emulating different analog/classic compressors. Other presets are included from industry professionals.

Technical Support

Trouble Shooting

How do I authorize the plug-in?

- McDSP plug-ins can be authorized via a license card and an iLok. Refer to the installation details provided in Chapter 2: Installing McDSP Plug-ins.
- McDSP Plug-in demos can be requested from www.mcdsp.com when an iLok.com account user name is provided. Demo authorizations are then placed in your account for transfer to your iLok. More detailed information is provided in Chapter 2: Authorizing with iLok.com in the Initialization section.

The plug-in does not appear in Insert popup.

- Check your installation of the individual plug-in or plug-ins you purchased.
- The plug-in will not appear in an insert popup if its trial period has expired or is not authorized.

Preset does not affect plug-in controls.

- Presets for the CB1, CB2, and CB3 configurations are interchangeable. For example, a preset created with a CB1 can be used in a CB2 and CB3 (mono and stereo). However, some of the controls in CB2 and CB3 are not available in CB1, just as some controls are not available in CB2 that are in CB3. If a preset has not affected any controls on the UI, it is because the controls that differed from the current ones on the CB configuration the user has switched to are not present in that CB configuration's UI. If an incompatible preset is used, such as a FilterBank EQ preset, CompressorBank will display a warning message accompanied by a system beep and retain the control settings before the preset was applied.

  The additional 'Modeled Comrpessor' CB4 makes use of a different preset format, and its presets are not compatible with other CompressorBank configuration, nor are other CompressorBank configuration presets compatible with CB4.

DAE Error -7450 While Processing Audio with AudioSuite version.

- The stereo AudioSuite versions of the plug-ins are capable of mono or stereo processing. If stereo processing is selected on a mono file, DAE will report an error indicating the right channel is not available for processing. Mono files should be processed/previewed in mono processing mode, or a mono AudioSuite version of the plug-in.

Presets do not appear in plug-in settings folder.

- Pro Tools™ will automatically create a plug-in settings folder when you run a plug-in in a Pro Tools™ Session. If no presets are created and saved in this folder, Pro Tools™ will delete it. To 'install' the presets shipped with you McDSP plug-in, simply copy the Presets folder from the plug-in package folder into Root->Library->Application Support->Digidesign->plug-in Settings. Note running the installer (even a second time) will add the plug-in presets to the appropriate location as well.

Bypass button does not respond.

- Verify the Pro Tools™ master bypass is off. Refer to Digidesign's™ ProTool's Reference Guide for detailed description of plug-in operations in Pro Tools™.

On Windows XP, when starting ProTools I get a 'Initialization Error' message box saying 'Updated driver required. The driver version is incompatible with this product and requires updating,' How do I fix this?

- If you just installed McDSP plug-in for the first time, you need reboot your PC and relaunch ProTools. If you just upgraded ProTools or installed a different company's plug-in, most likely an older version of PACE's driver was incorrectly installed. To resolve this, re-run any recent McDSP plug-in Installer and select Repair, reboot your PC, and relaunch ProTools. Alternatively, you may run the latest Pace InterLok drivers installer which is available from the 'Driver download page' at www.paceap.com/dldrvr.html

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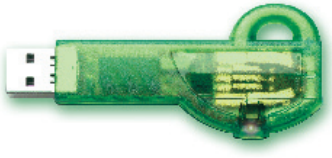
Authorizing your McDSP Plug-Ins

Authorizing with a pre-programmed iLok Smart Key



McDSP bundles such as the Emerald Pack come with a pre-programmed iLok Smart Key. Simply insert the iLok into any available USB port on your computer. The iLok's indicator light will illuminate when the iLok has a proper connection. The Plug-Ins included in the bundle require no further authorization steps. As with any iLok on your system it is recommended that your iLok be registered and synchronized with iLok.com

Authorizing with an iLok License Card

All McDSP Plug-Ins require that a valid authorization is present on your iLok USB Smart Key. McDSP Plug-ins that are purchased individually provide this authorization on a plastic License Card (about the size of a credit card), with a small punch-out iLok License Chip. After being separated from the License Card, this iLok License Chip is to be inserted into the 'key slot' of the iLok USB Smart Key in order to transfer the authorization from the License Card to the iLok USB Smart Key. Note that each License Card holds ONE Plug-In authorization. The following instructions detail this process

Important Note: The Authorization Wizard will prompt the user to register their iLok USB Smart Key at iLok.com. iLok.com is a service offered by PACE Anti-Piracy, Inc. and this step is recommended but NOT REQUIRED by McDSP to complete the authorization of the Plug-In. If you choose to register your iLok USB Smart Key at iLok.com, care must be taken to record your ilok.com account information (i.e. write down your User ID and Password in a safe place). If your iLok.com account information is lost, the iLok cannot be registered to another account and unfortunately there is nothing McDSP can do to help you. See iLok.com for more details about the benefits of using PACE's iLok.com service.

Note: Images in this section are for illustration only, the actual product and screens will be the name of the product you are authorizing.

Authorizing a McDSP Plug-In from a License Card with the Authorization Wizard:

The Authorization Wizard is used to install an authorization from a License Card to the iLok USB Smart Key. To use the Authorization Wizard for the Plug-In you purchase, perform the following steps:

- Insert your iLok USB Smart Key into an available USB port.
- On a Mac :Locate and launch the 'Authorizer' application found in the 'Authorize' folder in the Plug-In package for the McDSP Plug-In you purchased on the CD-ROM.
- On Windows XP or Vista, just launch Pro Tools™ to authorize the individual McDSP Plug-In you purchased.

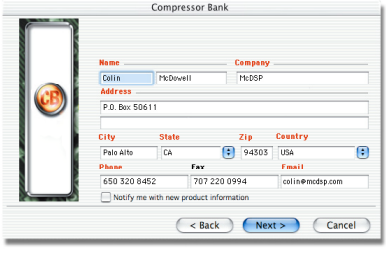
Note: When authorizing the Plug-In on Windows XP or Vista with a new iLok USB Smart Key, you must insert the iLok USB Smart Key and complete the Windows 'Found New Hardware Wizard' before attempting to authorize the Plug-In.

- Select the 'Authorize' button to be guided through the Authorization Wizard.

Compressor Bank
This Plug-In must be authorized with an iLok. An iLok License card is included in the Plug-In package. The iLok USB dongle may be purchased separately if one was not supplied with your system.
To authorize, select the "Authorize" button to be guided through the process. This version of software does not have a demonstration period.
Authorize
Quit

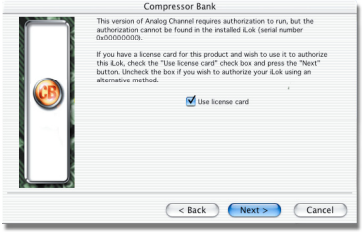
Note: Selecting the 'Quit' button at any time will not authorize the Plug-In or allow it to be used for a trial period. If 'Quit' is selected, the Plug-In will not be available in the Pro Tools™ insert menu.

- McDSP Plug-Ins require that the user personalize their copy of the Plug-In. A dialog is displayed soliciting this information.



Note that the product registration card enclosed with the Plug-In MUST ALSO be filled out as well and returned to McDSP via mail (or fax to 707-220-0994). This additional mail-in registration will entitle the user to future upgrades and advance information from McDSP.

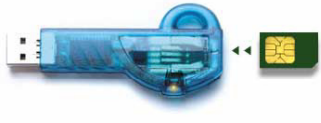
- Once the Plug-In is personalized, click the 'Next' button to continue.
- Check the 'Use License Card' box and press the 'Next' button (figure 2.3).


Compressor Bank
This version of Analog Channel requires authorization to run, but the authorization cannot be found in the installed iLok (serial number 0x00000000).
If you have a license card for this product and wish to use it to authorize this iLok, check the "Use license card" check box and press the "Next" button. Uncheck the box if you wish to authorize your iLok using an alternative method.
Use license card
< Back
Next >
Cancel

Note: Although the Authorization Wizard may appear to allow authorization by challenge/ response, that method is currently NOT SUPPORTED McDSP Plug-Ins.

- Separate the small punch-out iLok License Chip (the removable metal and plastic tab) from the License Card by pushing the cutout up and out with your thumb. Do not force your finger downward.

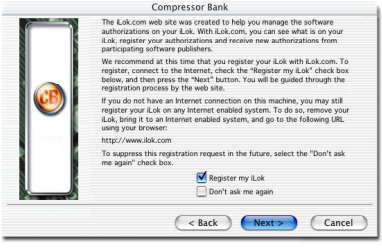
- The iLok License Chip may now be inserted into the 'key slot' of the iLok USB Smart Key (figure 2.6). If the iLok USB Smart Key does not appear to be present on the system, ensure the iLok USB Smart Key is connected to a valid USB port and that the green LED is lit inside the iLok USB Smart Key. To insert the License Chip into the iLok USB Smart Key, orient the iLok USB Smart Key's USB end to the left, and the loop end to the upper right. Insert the metal chip end of the iLok License Chip (the License Chip tab should have the metal chip side facing up towards you, not down). You should be able to visually verify that the License Chip makes contact with the iLok USB Smart Key metal card reader.



- The green LED in the iLok USB Smart Key will light when it is ready to receive and transmit data.
- Upon inserting the iLok License Chip, a message will be displayed indicating the authorization was installed successfully. Click 'Ok' in the message dialog.

Authorization Successfully Installed
Authorization to run Compressor Bank has been successfully installed from your license card to your iLok (serial number 0x00000000).
OK

- Once the authorization is installed on the iLok USB Smart Key, a dialog is displayed prompting the user to register their iLok USB Smart Key at the www.ilok.com website. The iLok.com website was created to allow users to manage the software authorizations on their iLok USB Smart Key. THIS STEP IS NOT REQUIRED TO COMPLETE THE AUTHORIZATION OF MCDSP SOFTWARE. The registration of the iLok USB Smart Key to an iLok.com account can be bypassed by clearing the checkbox. The user may also choose to not be asked to register again. While iLok.com is a great resource for the iLok USB Smart Key, your iLok USB Smart Key may only be linked to one iLok.com account. That is, an individual iLok USB Smart Key can only be registered to one account at a time--but a single account can have multiple iLok USB Smart Keys. If the iLok.com account information is lost, the iLok USB Smart Key cannot be registered to another account. However, an iLok USB Smart Key may be transferred between accounts if all the authorizations have been transferred off the iLok USB Smart Key. Register the iLok USB Smart Key to an iLok.com account only when you are ready to retain all the needed iLok.com account information (User ID and Password).


Compressor Bank
The iLok.com web site was created to help you manage the software authorizations on your iLok. With iLok.com, you can see what is on your iLok, register your authorizations and receive new authorizations from participating software publishers.
We recommend at this time that you register your iLok with iLok.com. To register, connect to the Internet, check the "Register my iLok" check box below, and then press the "Next" button. You will be guided through the registration process by the web site.
If you do not have an Internet connection on this machine, you may still register your iLok on any Internet enabled system. To do so, remove your iLok, bring it to an Internet enabled system, and go to the following URL using your browser:
http://www.ilok.com
To suppress this registration request in the future, select the "Don't ask me again" check box.
Register my iLok
Don't ask me again
< Back
Next >
Cancel

- A 'Finished' dialog is displayed showing what authorization method was used.
- Click 'Finish' to exit the Authorization Wizard.

Authorizing with iLok.com

Required for demo, upgrade, and replacement authorizations only

iLok.com can be accessed from any Macintosh or PC with an Internet connection. You can do this at home, a friend's, or at the office as long as there is an internet connection to access iLok.com--note that you don't have to use your ProTools system computer! You simply use this computer to connect to iLok.com and transfer authorizations to your iLok Smart Key. The iLok Smart Key can then be moved to your ProTools system to complete authorization of your Plug-In.

You will need:

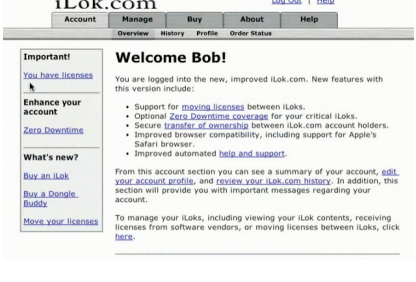
- A computer with an Internet connection. Either a Macintosh running OS 9.2 to OS 10.3 or a PC running Windows 98, ME, 2000, XP, or Vista
- An iLok USB Smart Key
- A valid iLok.com account. Visit www.iLok.com and set up a free account, if you have not already done so.

1) Download and install the required client software from iLok.com.

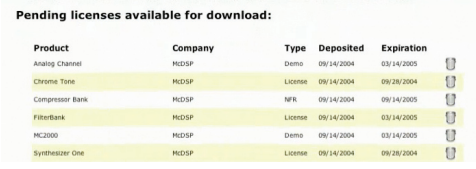
2) Download the desired McDSP Plug-In Installer from: http://www.mcdsp.com/support/updating.html

3) To receive an upgrade or replacement authorization, send email your iLok.com account information to: support@mcdsp.com
To receive a demo authorization, email your iLok.com account information to: authorize@mcdsp.com

Insert your iLok Smart Key into an available USB port and ensure that the indicator light is lit. Once your demo, upgrade, or replacement authorization is available for transfer, your iLok.com account will display the notice saying "You have licenses" on the upper left. Begin by selecting that link.


iLok.com v2.0
Log Out | Help
Account
Manage
Buy
About
Help
Overview
History
Profile
Order Status
Important!
You have licenses
Enhance your account
Zero Downtime
What's new?
Buy an iLok
Buy a Dongle Buddy
Move your licenses
Welcome Bob!
You are logged into the new, improved iLok.com. New features with this version include:
Support for moving licenses between iLoks.
Optional Zero Downtime coverage for your critical iLoks.
Secure transfer of ownership between iLok.com account holders.
Improved browser compatibility, including support for Apple's Safari browser.
Improved automated help and support.
From this account section you can see a summary of your account, edit your account profile, and review your iLok.com history. In addition, this section will provide you with important messages regarding your account.
To manage your iLoks, including viewing your iLok contents, receiving licenses from software vendors, or moving licenses between iLoks, click here.

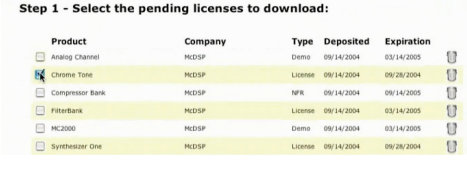
The next page will display the pending licenses available for download. This page will also display the name of the Plug-In, its manufacturer, the type of authorization (demo, Not For Resale, or License), the date the authorization was deposited, and the date when the authorization will no longer be available for download from the server.



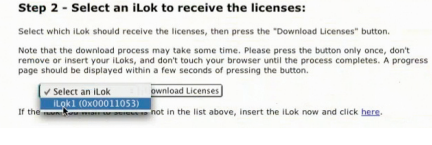
Before any transfer of authorizations can take place, you must synchonize your iLok Smart Key with iLok.com. This may take a moment to process depending on your internet connection.

Insert your iLoks and synchronize:
Before downloading licenses, you must insert one or more iLoks as needed and press the "Synchronize" button. Once your iLoks are synchronized with your account, you will be able to select the licenses to download and the target iLok to receive the licenses.
Note that the synchronization process may take some time. Please press the button only once, don't remove or insert your iLoks, and don't touch your browser until the process completes. A progress page should be displayed within a few seconds of pressing the button.
Synchronize

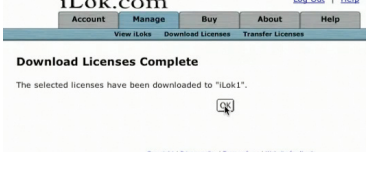
Once you have synchronized your iLok, you can select the authorization(s) you wish to transfer to your iLok.



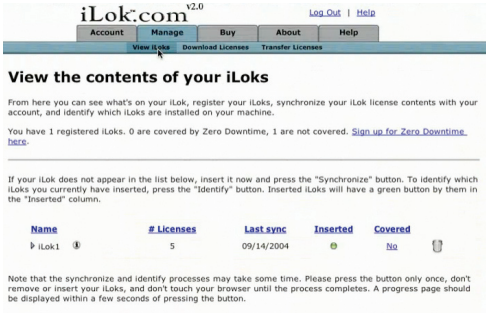
If you have multiple iLoks connected to your computer, it is important to select the correct iLok you wish the authorizations to be transferred to. Then click "Download Licenses" to begin the process. Again, this may take a moment depending on your internet connection.


Step 2 - Select an iLok to receive the licenses:
Select which iLok should receive the licenses, then press the "Download Licenses" button.
Note that the download process may take some time. Please press the button only once, don't remove or insert your iLoks, and don't touch your browser until the process completes. A progress page should be displayed within a few seconds of pressing the button.
Select an iLok
iLok1 (0x00011053)
ownload Licenses
here.

When the transfer finishes you will be asked to confirm the completition of the transaction, thereby letting you know that the transfer was successful.



If you wish to go back into your account and visually confirm the transaction for yourself, select “View iLoks” Then select the iLok you had the authorizations transferred to.


iLok.com v2.0
Log Out | Help
Account
Manage
Buy
About
Help
View iLoks
Download Licenses
Transfer Licenses
View the contents of your iLoks
From here you can see what's on your iLok, register your iLoks, synchronize your iLok license contents with your account, and identify which iLoks are installed on your machine.
You have 1 registered iLoks. 0 are covered by Zero Downtime, 1 are not covered. Sign up for Zero Downtime here.
If your iLok does not appear in the list below, insert it now and press the "Synchronize" button. To identify which iLoks you currently have inserted, press the "Identify" button. Inserted iLoks will have a green button by them in the "Inserted" column.
Name
Licenses
Last sync
Inserted
Covered
iLok1
5
09/14/2004
No
Note that the synchronize and identify processes may take some time. Please press the button only once, don't remove or insert your iLoks, and don't touch your browser until the process completes. A progress page should be displayed within a few seconds of pressing the button.

That’s it! Dont forget to logout and move the iLok Smart Key to your ProTools System if you are using another computer for Internet access. Also, you may need to install a different version of the Plug-In if you are upgrading or replacing.

Transferring Authorizations with iLok.com

You may freely transfer any authorization within your iLok.com account between any of your registered iLok Smart Keys. If you wish to transfer an authorization out of your iLok.com account to a different user, it will require additional support from PACE Anti-Piracy, Inc and may be subject to a service fee or limited by manufacturer restrictions. Check the www.ilok.com website for updates and developments regarding iLok USB Smart Keys and the Pace Interlok Copy Protection system.

Registering your McDSP Plug-In

To register your McDSP Plug-In, fill out and return the product registration card enclosed with the boxed Plug-In package by mail or fax 707-220-0994. Registering your product entitles you to future upgrades and advance information from McDSP. Each individual product must be registered (even if you have multiple copies), and the product must be registered to an individual, not an entity. If you represent a company it is your company's responsibility to notify McDSP in writing if the individual who registered the Plug-In is no longer with the company. The Company must also be able to supply matching registration information to successfully transfer ownership of the Plug-In.

Using your McDSP Plug-Ins

Starting a McDSP Plug-In:

Follow the installation, authorization, and registration instructions above, Launch Pro Tools™, and the McDSP Plug-In and its presets are ready for use. Refer to the Digidesign™ Pro Tools™ Reference Guide for details on general Plug-In operation such as automation.

Exiting a McDSP Plug-In

A McDSP Plug-In is exited by clicking on the desktop or other window in the DAE application running the Plug-In, closing the Plug-In window, or de-instantiating the Plug-In. Pro Tools™ sessions will save instantiated Plug-In configurations and their settings. Refer to the Digidesign™ Pro Tools™ Reference Guide for details on general Plug-In operation.

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www.mcdsp.com

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